ISASC

TERNATIONAL SOCIETY OF ANTIQUE SCALE COLLECTOR

NEWSLETTER 16

This Newsletter is a literary contribution to the history of scales. My fellow members of the ISACS, I hope, will forgive me.

The Birth of a Scale *)

A Chronicle

by E. Fritz Schmerl

The body on the stone slab was one of a young woman with fine facial features. The ashen hue of her skin signified the presence of death. At age twenty-two she had just given birth to a healthy well-developed boy. By now, five flights up, he was well taken care of in the hands of the sophisticated and devoted staff in the hospital nursery, which is two doors away from her delivery room. Nine days after he was born, his mother lay dead.

Her body was surrounded by six doctors. They were staring at it with darkened expressions, perplexed, sad, defeated and, yet, intensely curious. There was an air of tension. I felt it. I was one of the six. I sensed an anticlimatic letdown.

It had been nine days ago that I, the internist of the team, was called into consultation. The obstetrician, in charge of the case, had been faced with an apparently insoluble problem. He had consulted two senior staff obstetricians, also a pathologist, a kidney specialist (urologist) and an endocrinologist (master of glands), all men of wide experience, of special knowledge, of professorial caliber. Futhermore, the case of Vera Mulling had become the number one topic in the hospital Medical Staff lounge where dozens of staff doctors meet for a breeze between assignments and exchange opinions, views and stories.

In the days of the early fifties Vera's health problem was not an uncommon one. Near the end of her pregnancy, this was her first, and -alas- her only one ever-, she developed a complication known to the profession as eclampsia. Eclampsia is a form of toxemia, a disturbance in which the body's chemistry is overloaded and derailed, a poisonous accumulation of those waste products which are ordinarily carried away into the urine. In the healthy there is an intricate biochemical and biophysical balance (homeostosis), finely tuned, meticulously maintained, indeed, a miraculous accomplishment by mother nature.

As it is characteristic for eclampsia, Vera Mulling (not her true name) had convulsions; her blood pressure was high. She suffered from watery swellings (edema). There was seepage of valuable body proteins through the kidney into the bladder. It led to loss of consciousness, to coma, then relentlessly to her death.

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In 1953, the year I witnessed the chilling fate of Vera Mulling, eclampsia was still one of the "doctors dilemmas," especially in those cases in which it still persisted after delivery. When the pregnancy was terminated, however, eclampsia was often controlled and, indeed, the mother's life could be saved. But Vera Mullings' condition continued to worsen even after her baby had arrived.

It happened that Vera was immensely obese. When she was due to deliver , she weighed 210 pounds. Some of the excess weight was excess fat but some was excess body water which for weeks had been blocked at the kidney's poorly functioning "watergate." The fluid was trapped.

There was an ominous tendency to electrolyte imbalance called acidosis. Tests showed us serum sodium (a salt component) to be much too low. When, in order to correct this and to replenish the missing material, salt solutions were infused into her vein, she would retain even more fluid. This would drive up the blood pressure and flood her lungs. She then became seriously short of breath. But when salt solutions were withheld her acidosis became dangerously worse.

In those days, blood analysis was still inaccurate and much too slow, especially the test for potassium and for carbondioxide. Their reports were often obsolete by the time we received them.

The doctors were aware then that, by treating the primary condition of acidosis, one would increase the danger of inundating the lungs (pulmonary edema) and pushing up the blood pressure to a dangerous level.

Did we deal with a real lack of sodium in the blood (hyponatremia)? Or was there a glut of fluid with inordinate dilution of salt (hyperhydration)? What would happen to the fluid given intravenously (i.v.)? What heppened when fluid was withheld? How could, at any given time, the momentary capricious salt and water needs be determined and monitored?

The helplessness with which we physicians watched the biochemical vagaries from hour to hour in the course of Vera Mulling's condition, was wellnigh despairing. Scientific insight and clinical judgment had to be helped along with guesses and hunches and wait-and-see. "Watchful expectancy" was at times the dictate of wisdom.

A late answer to the complex riddle came forth not until we stood near Vera Mulling's dead body. As the autopsy proceeded we were astonished at the immense amounts of fluid in which all organs, chest, abdomen and limbs, were literally drenched. Wherever the pathologist's knife cut a virtual well of body fluid opened.

It was estimated that the excess of water in Vera's body was about twenty-two liters (=21 quarts). The contours of the ample fat tissue had been able to conceal deceptively all this watery addition without tipping off the trained observers.

As I contemplated the young body an idea gripped me firmly, a thought raised so often during my medical teaching rounds at the County hospital: If only we would have been able to monitor body weight changes during her illness, it would have helped us to find out how much additional fluid if any were needed and at what stage we would reach the limit and withhold infusions for optimal biochemical benefits; we could determine the speed of infusion, drop by drop, and the total amounts needed to maintain proper concentrations of blood and tissue constituents.

Continuous weighing would be a non-invasive test (no needle pokes) and-how important! -its results, contrary to chemical tests, would be instantly available at the bedside.

But, in those years the idea of weighing a critically ill, bedridden patient was utterly foreign to the physician's mind. Mere weighing people as a clinical testing procedure was absurd.

Thus, IN-BED WEIGHING was born in my mind. I formulated it then in the Journal of the American Medical Association (December 11, 1954). The idea to weigh the bedridden and to assess weight fluctuations as an adjunct clinical indicator, novel as it was then, spread during the years that followed, throughout the medical world.

One of the difficulties was to weigh a bedridden patient "within the bed" but "without the bed". It should be clear to everyone that tare weight, for instance bedding when changed or weighted with urine, will easily falsify body weight fluctuations from hour to hour unless the patient and nothing but the patient is being weighed.

But the new theoretical concept of IN-BED WEIGHING for electrolyte balancing was soon followed by the development of a novel weighing device. I was fortunate enough, and I am thankful to my creator for that, to hit upon an idea which made its practical application possible. It was in those days, however, when I learned that, in order to move the world forward, even by one single spoke, it takes PERspiration as well as INspiration.

I give my friend Bob Roberts, the young owner of the Acme Scale Company, credit for ignoring his many doubts and for letting me work in his shop, for helping me build the first three handmade IN-BED SCALES. For a long time, as he admitted later, he considered me a typical crackpot ("Why not wait until your patient is out of bed and weigh him then?")

The second experimental model was found most useful and, indeed, lifesaving in the West Coast's first artificial kidney installation at the Oak Knoll Navy Hospital's Metabolic Units, Oakland, California. There, proper electrolyte and water balancing was of critical importance. My new scale was the answer to their prayers.

Nowadays, there are many medical conditions in which the IN-BED SCALE proves indispensable as a complement to the most sophisticated automated laboratory procedures: The present emphasis on long-range benefits of body weight control, even in the bedridden and wheelchair patient, has led to the acceptance of the IN-BED SCALE in virtually all medical institutions throughout the land.

By now, it has become a standard piece of hospital equipment in all Intensive Care Units and Cardiac Care hospital Units where it helps restore the stricken to a new useful life.

I am delighted to be able to share with all my readers the dramatic incident way back in 1953 which gave rise to the IN-BED SCALE now rolling from bedside to bedside.

When the history of scales is to be recorded, young Vera Mulling's tragic contributions to progress will become a part of it.

Ever since her death twenty-five years ago advances in medicine have been stupendous. Thanks to a number of innovations, among them prenatal care and dietary control, biochemical insight and new powerful drugs, improved technology, which includes the IN-BED SCALE, the threat of eclampsia has been drastically reduced. And when it occurs nowadays, the chance to recover and to regain perfect health is excellent. It is likely that Vera Mulling's drama will not be played again on the stage of medical history.

* * *

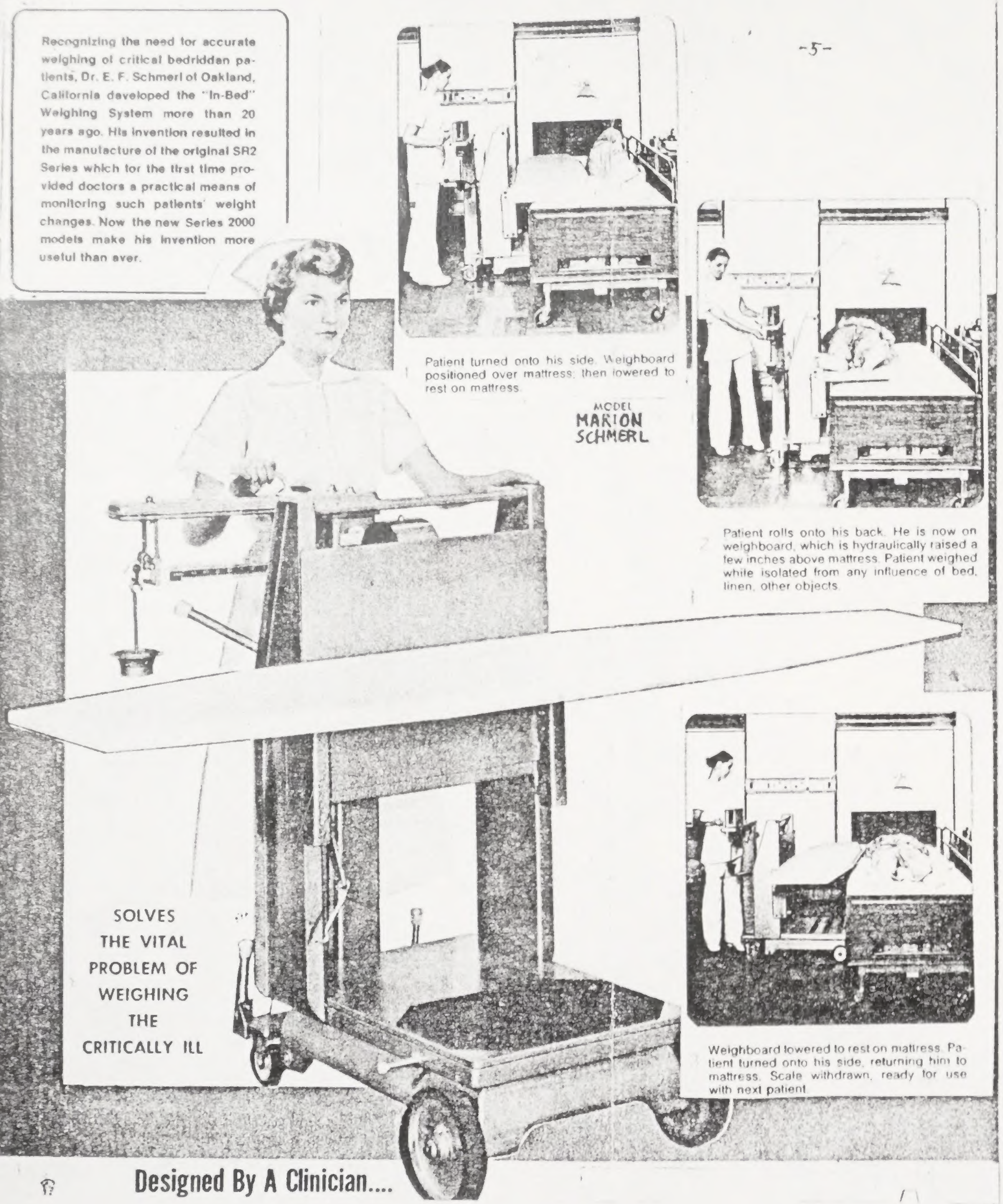
CLINICAL CONDITIONS IN WHICH USE OF THE IN BED-SCALE IS INDICATED

ELECTROLYTE IMBALANCE
PROLONGED VOMITING
SEVERE DIARRHEA
POST-OPERATIVE STAGE
HEMORRHAGE

ACUTE ABDOMEN
THERMAL BURNS
MAJOR TRAUMA
SHOCK
HEART SURGERY
DIALYSIS

CONGESTIVE HEART FAILURE
ACUTE RENAL FAILURE
UREMIA
DIABETIC COMA
LIVER FAILURE

MALNUTRITION, INANITION
DEHYDRATION
METABOLIC, RESPIRATORY OR RENAL ACIDOSIS
ALKALOSIS
ENDOCRINE PROBLEMS



Recognizing the need for accurate weighing of critical bedridden patients, Dr. E. F. Schmerl of Oakland, California developed the "In-Bed" Weighing System more than 20 years ago. His invention resulted in the manufacture of the original SR2 Series which for the first time provided doctors a practical means of monitoring such patients' weight changes. Now the new Series 2000 models make his invention more useful than ever.

Patient turned onto his side. Weighboard positioned over mattress; then lowered to rest on mattress.

Patient rolls onto his back. He is now on weighboard, which is hydraulically raised a few inches above mattress. Patient weighed while isolated from any influence of bed, linen, other objects.

Weighboard lowered to rest on mattress. Patient turned onto his side, returning him to mattress. Scale withdrawn, ready for use with next patient.

SOLVES
THE VITAL
PROBLEM OF
WEIGHING
THE
CRITICALLY ILL

Designed By A Clinician....

1959

REPRESENTATIVE USERS LIST OF THE IN-BED SCALE

MAXWELL AIR FORCE BASE HOSPITAL	ALABAMA	
VETERANS ADMINISTRATION HOSPITAL	NORTH LITTLE ROCK, ARKANSAS	
HIGHLAND ALAMEDA COUNTY HOSPITAL	OAKLAND, CALIFORNIA	2 scales
OAK KNOLL NAVAL HOSPITAL	OAKLAND, CALIFORNIA	3 scales
FAIRMONT HOSPITAL	SAN LEANDRO, CALIFORNIA	2 scales
U.C.L.A. MEDICAL CENTER	LOS ANGELES, CALIFORNIA	2 scales
SONOMA COUNTY HOSPITAL	SANTA ROSA, CALIFORNIA	2 scales
UNIVERSITY OF CALIFORNIA HOSPITAL	SAN FRANCISCO, CALIFORNIA	3 scales
PACIFIC STATE HOSPITAL	POMONA, CALIFORNIA	10 scales
SONOMA STATE HOSPITAL	ELDRIDGE, CALIFORNIA	5 scales
DENVER GENERAL HOSPITAL	DENVER, COLORADO	2 scales
COMM. CHRONICALLY ILL, WOODRUFT CENTER	NEW HAVEN, CONNECTICUT	
ST. FRANCIS HOSPITAL MEDICAL CENTER	HARTFORD, CONNECTICUT	
WALTER REED ARMY HOSPITAL	WASHINGTON D.C.	3 scales
DISTRICT OF COLUMBIA GENERAL HOSPITAL	WASHINGTON D.C.	3 scales
JACKSON MEMORIAL HOSPITAL	MIAMI, FLORIDA	
UNIVERSITY OF FLORIDA	GAINESVILLE, FLORIDA	6 scales
EMERY UNIVERSITY HOSPITAL	ATLANTA, GEORGIA	
VETERANS ADMINISTRATION HOSPITAL	CHICAGO, ILLINOIS	2 scales
INDIANA UNIVERSITY MEDICAL CENTER	INDIANAPOLIS, INDIANA	2 scales
UNIVERSITY OF IOWA HOSPITAL	IOWA CITY, IOWA	
UNIVERSITY OF KANSAS HOSPITAL	KANSAS CITY, KANSAS	2 scales
THE OSCHNER FOUNDATION HOSPITAL	NEW ORLEANS, LOUISIANA	
NATIONAL INSTITUTE OF HEALTH	BETHESDA, MARYLAND	4 scales
BALTIMORE CITY HOSPITAL	BALTIMORE, MARYLAND	3 scales
PETER BENT BRIGHAM HOSPITAL	BOSTON, MASSACHUSETTS	
UNIVERSITY OF MICHIGAN HOSPITAL	ANN ARBOR, MICHIGAN	3 scales
HERMAN KIEFER HOSPITAL	DETROIT, MICHIGAN	
THE MAYO CLINIC	ROCHESTER, MINNESOTA	
UNIVERSITY OF MISSOURI MEDICAL CENTER	COLUMBIA, MISSOURI	2 scales
UNIVERSITY MEDICAL CENTER	JACKSON, MISSISSIPPI	
VETERANS ADMINISTRATION HOSPITAL	LINCOLN, NEBRASKA	
WASHOE MEDICAL CENTER	RENO, NEVADA	
MARY HITCHCOCK HOSPITAL	HANOVER, NEW HAMPSHIRE	
THE NEW YORK HOSPITAL	NEW YORK, NEW YORK	16 scales
U.S. NAVAL HOSPITAL	ST. ALBANS, NEW YORK	2 scales
THE OVERLOOK HOSPITAL	SUMMITT, NEW JERSEY	
DUKE UNIVERSITY HOSPITAL	DURHAM, NORTH CAROLINA	3 scales
VETERANS ADMINISTRATION HOSPITAL	FARGO, NORTH DAKOTA	
UNIVERSITY HOSPITAL OF CLEVELAND	CLEVELAND, OHIO	2 scales
HIGHLAND VIEW COUNTY HOSPITAL	CLEVELAND, OHIO	6 scales
U.S. ARMY HOSPITAL	FORT SILL, OKLAHOMA	2 scales
GOOD SAMARITAN HOSPITAL	PORTLAND, OREGON	
VETERANS ADMINISTRATION HOSPITAL	COATESVILLE, PENNSYLVANIA	3 scales
POLK STATE SCHOOL HOSPITAL	POLK, PENNSYLVANIA	4 scales
RHODE ISLAND HOSPITAL	PROVIDENCE, RHODE ISLAND	
MEDICAL COLLEGE OF SOUTH CAROLINA	CHARLESTON, SOUTH CAROLINA	
VETERANS ADMINISTRATION HOSPITAL	MEMPHIS, TENNESSEE	
VETERANS ADMINISTRATION HOSPITAL	DALLAS, TEXAS	3 scales
BROOKES ARMY HOSPITAL	FORT SAM HOUSTON, TEXAS	2 scales
ST. MARK'S HOSPITAL	SALT LAKE CITY, UTAH	
VETERANS ADMINISTRATION HOSPITAL	WHITE RIVER JUNCTION, VERMONT	2 scales
UNIVERSITY OF VIRGINIA HOSPITAL	CHARLOTTESVILLE, VIRGINIA	2 scales
VETERANS ADMINISTRATION HOSPITAL	RICHMOND, VIRGINIA	2 scales
UNIVERSITY OF WASHINGTON HOSPITAL	SEATTLE, WASHINGTON	3 scales
VETERANS ADMINISTRATION HOSPITAL	MARTINBERG, WEST VIRGINIA	
ST. LUKE'S HOSPITAL	MILWAUKEE, WISCONSIN	
SASKATCHEWAN HOSPITAL	WEYBURN, SASKATCHEWAN, CANADA	
MONTREAL GENERAL HOSPITAL	MONTREAL, QUEBEC, CANADA	
ONTARIO HOSPITAL	WOODSTOCK, ONTARIO, CANADA	2 scales
ALBERTA CRIPPLED CHILDREN'S HOSPITAL	CALGARY, ALBERTA, CANADA	
DEER LODGE HOSPITAL	ST. JAMES, MANITOBA, CANADA	
TORONTO HOSPITAL	TORONTO, ONTARIO, CANADA	2 scales
QUEENS HOSPITAL	HONOLULU, HAWAII	

H. GORDON MACLEAN, M.D.
THOMAS C. McCLEAVE JR. M.D.
230 GRAND AVENUE
OAKLAND 10, CALIFORNIA

Scale
↑

E. F. Schmerl, M.D.
2933 Webster Street
Oakland 9, California

Dear Fritz:

I have read your manuscript with interest, and commend the work that you and Dr. Upton have done. I have forwarded the manuscript to Dr. Whitecotton, as it should also have his approval as Medical Director of the Hospital.

Sincerely yours,

Tom

T. C. MC CLEAVE, JR., M.D.

TCM:b

May Twenty
Nineteen Hundred and Fifty-four

CC: Albert L. Upton, M.D.

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In your reply please refer to these initials | AS:A

August 9, 1954

Dr. E. F. Schmerl
2933 Webster Street
Oakland 9, California

Dear Doctor Schmerl:

The paper by you and Doctor Upton entitled "The In-Bed Scale: A New Scale for Universal Hospital Use" has been accepted for publication in THE JOURNAL, as a Clinical Note, subject to slight editorial modification and subject to a delay in publication due to the large backlog of communications now awaiting publication. This paper is also accepted with the understanding that it is contributed solely to this journal.

A proof will be sent to you before publication.

Very truly yours,

JOURNAL AMERICAN MEDICAL ASSOCIATION
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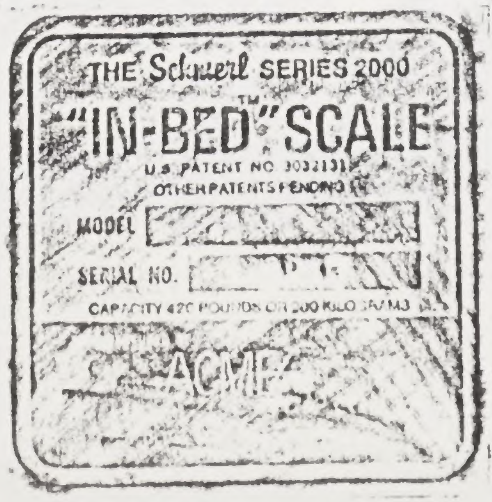

Scale
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← RUBBING of a LABEL